Vacuum circuit breakers

Evolis from 7.2 to 24 kV

Catalogue

2006

a brand of Schneider Electric

Merlin Gerin

The Guiding System, the new way to create your electrical installations

A comprehensive offer of products with consistent design

The Guiding System is first and foremost a Merlin Gerin product offer covering all electrical distribution needs. However, what makes all the difference is that these products have been designed to operate togheter: mechanical and electrical compatibility, interoperability, modularity, communication.
Thus the electrical installation is both optimised and more efficient: better continuity of supply, enhanced safety for people and equipment, guaranteed upgradeability, effective monitoring and control.

Tools to simplify design and implementation

With the Guiding System, you have a comprehensive range of tools - the Guiding Tools - that will help you increase your product knowledge and product utilisation. Of course this is in compliance with current standards and procedures.
These tools include technical booklets and guides, design aid software, training courses, etc. and are regularly updated.

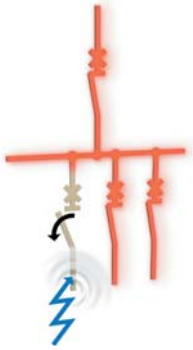
The Guiding System, combined with the know-how and creativity, allows optimised, reliable, open-ended and standard compliant installations

For a genuine partnership with you

Because each electrical installation is unique, there is no standard solution. With the Guiding System, the variety of combinations allows for genuine customisation solutions. You can create and implement electrical installations to meet your creative requirements and design knowledge.
You and Merlin Gerin's Guiding System form a genuine partnership.

For more details on the Guiding System, consult www.merlin-gerin.com

A consistent design of offers from Medium Voltage to Ultra terminal



Discrimination guarantees co-ordination between the operating characteristics of serial-connected circuit-breakers. Should a fault occurs downstream, only the circuit-breaker placed immediately upstream from the fault will trip.

Prefabricated and tested solutions, upstream and downstream from the device complying with the IEC 60439-1 switchboard standard.

Transparent Ready

Thanks to the use of standard Web technologies, you can offer your customers intelligent Merlin Gerin switchboards allowing easy access to information: follow-up of currents, voltages, powers, consumption history, etc.

Guiding Tools for more efficient design and implementation of your installations.

All Merlin Gerin offers are designed according to electrical, mechanical and communication consistency rules.
The products express this consistency by their overall design and shared ergonomics.

Electrical consistency:

Each product complies with or enhances system performance at co-ordination level: breaking capacity, Isc, temperature rise, etc. for more safety, continuity of supply (discrimination) or economic optimisation (cascading).
The leading edge technologies employed in Merlin Gerin's Guiding System ensure high performance levels in discrimination and cascading of protection devices, electrodynamic withstand of switches and current distributors, heat loss of devices, distribution blocks and enclosures.
Likewise, inter-product ElectroMagnetic Compatibilty (EMC) is guaranteed.

Mechanical consistency:

Each product adopts dimensional standards simplifying and optimising its use within the system.
It shares the same accessories and auxiliaries and complies with global ergonomic choices (utilisation mode, operating mode, setting and configuration devices, tools, etc.) making its installation and operation within the system a simpler process.

Communication consistency:

Each product complies with global choices in terms of communication protocols (Modbus, Ethernet, etc.) for simplified integration in the management, supervision and monitoring systems.

SM6

Medium voltage switchboard system from 1 to 36 kV

Sepam

Protection relays

Masterpact

Protection switchgear from 100 to 6300 A

Trihal

MV/LV dry cast resin transformer from 160 to 5000 kVA

Evolis

MV vacuum switchgear and components from 1 to 24 kV

The Technical guide

These technical guides help you comply with installation standards and rules i.e.:
The electrical installation guide, the protection guide, the switchboard implementation guide, the technical booklets and the co-ordination tables all form genuine reference tools for the design of high-performance electrical installations.
For example, the LV protection co-ordination guide - discrimination and cascading - optimises choice of protection and connection devices while also increasing markedly continuity of supply in the installations.

CAD software and tools

The CAD software and tools enhance productivity and safety.
They help you create your installations by simplifying product choice through easy browsing in the Guiding System offers.
Last but not least, they optimise use of our products while also complying with standards and proper procedures.

Compact

Protection switchgear system
from 100 to 630 A

Multi 9

Modular protection switchgear
system up to 125 A

Prisma Plus

Functional system for electrical
distribution switchboards
up to 3200 A

Pragma
Enclosures for
distribution
switchboards
up to 160 A

Canalis
Prefabricated Busbar
Trunking
from 25 to 4000 A

PowerLogic
Power
management

Training

Training allows you to acquire the Merlin Gerin expertise (installation design, work with power on, etc.) for increased efficiency and a guarantee of improved customer service.
The training catalogue includes beginner's courses in electrical distribution, knowledge of MV and LV switchgear, operation and maintenance of installations, design of LV installations to give but a few examples.

merlin-gerin.com

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Evolis
Circuit breakers adapted to your needs

Evolis: a range of circuit breakers that takes account of your electrical installations' requirements today and in the future.

Evolis is an integral part of the Merlin Gerin Guiding System.

Description

Evolis: a range of vacuum-type circuit breakers from 7.2 kV to 24 kV, combining easy selection and a comprehensive offer:

- a fixed, frontal or lateral version
- a withdrawable, frontal version with a circuit breaker and cradle
- a fixed, lateral version equipped with an integrated protection chain
- separately delivered accessories.

The Evolis circuit breaker is operated via a spring mechanism that gives an operating speed that is independent of the operator and that does not require an auxiliary power supply.
When the operating mechanism is motorized the circuit breaker can include telecontrol functions and carry out rapid reclosing cycles.
The various circuit breaker versions are easy to integrate in a cubicle environment.
An Installation Guide details the required procedure.

Applications

Evolis is intended for use in medium voltage network applications, in new installations or renovation, for utilities companies, infrastructures, the process industry and the tertiary sector.
It provides protection for all types of applications: cables, overhead lines, motors, capacitors, transformers, source busbar sections, etc.

Evolis, a fixed, frontal or lateral version

Here the circuit breaker is in its simplest version. In this case it can be combined with additional accessories to meet various requirements.
For the fixed lateral version, the MV connection can be on the right or on the left depending on the type of circuit breaker.

PE55938

Evolis 17.5 kV fixed, frontal version

PE55692

Evolis 24 kV fixed, frontal version

PE55930

Evolis 24 kV fixed, lateral version
MV connection on the left hand side

PE55931

Evolis 24 kV fixed, lateral version
MV connection on the right hand side

Evolis
Circuit breakers adapted to your needs (cont.)

Evolis: a withdrawable, frontal version

In this version, the circuit breaker is equipped with arms, clusters and a rack and cradle. The cradle and the circuit breaker can be ordered and delivered separately.

PE55939

Evolis 17.5 kV withdrawable, frontal version

PE55693

Evolis 24 kV withdrawable, frontal version

EVOset: a fixed, lateral version equipped with an integrated protection chain

The EVOset is provided with a fully autonomous integrated protection chain (with a VIP type control unit) operating without an auxiliary power source. The protection unit exists in 4 models: VIP30, VIP35, VIP300P and VIP300LL. VIP protection units are associated with functional current sensors. The circuit breaker is delivered with its factory-tested protection chain. It therefore simplifies the panel builder's installation work.

PE55932

EVOset 24 kV fixed, lateral version
MV connection on the right hand side

As a specialist in breaking technologies, Merlin Gerin took naturally an interest in vacuum breaking techniques.
A major R&D investment was made to develop and engineer Evolis, providing customers with the very best of vacuum technology.

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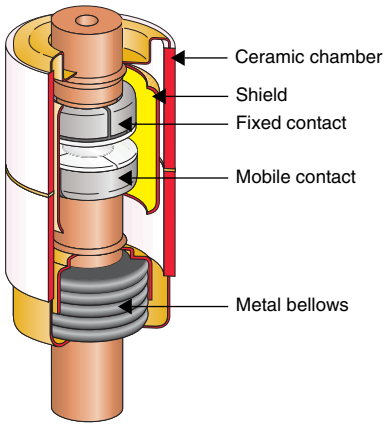

Fig. 1: vacuum interrupter components

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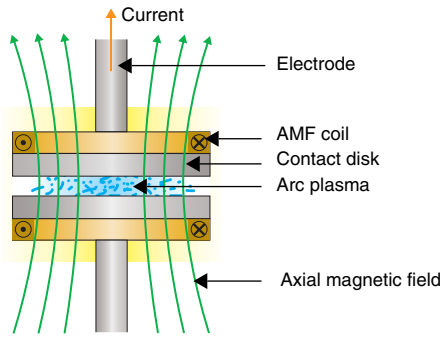

Fig. 2: cross-section of AMF contact

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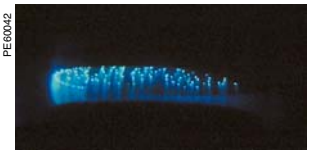

Fig. 3: diffuse vacuum arc AMF technology

Make-up of a vacuum interrupter

Vacuum interrupters basically have two electrical contacts, one fixed and the other mobile, and a sealed enclosure. The latter enables a high level of vacuum to be maintained inside the interrupter (less than 10^{-2} Pa) to provide insulation between the open contacts.

The dielectric strength of the vacuum allows the contact-to-contact distance to be reduced. This short distance together with the low opening speed allow the use of a low energy control mechanism. A metal clusters provides the link between the mobile contact and the enclosure.

In order to keep the vacuum level required for the correct operation of the interrupter for 30 years, the enclosure must be perfectly sealed, and the various components have to be fully degased. This is achieved by:
- choosing materials that are specifically selected for this application (metals and ceramics)
- choosing an appropriate assembly process (vacuum, high temperature brazing)
- the use of a “getter” material to absorb the residual gas.

Current breaking in a vacuum interrupter

In vacuum breaking, the electrical arc generated on separation of the contacts is made up of a plasma of metal vapors produced by the vaporization of the contact material.

At low values of current, these vapors very quickly condense on the shield and contacts when the arc disappears, thus allowing:
- the vacuum to be re-established
- a contact-to-contact dielectric strength to be restored that is greater than the recovery voltage: breaking is then complete.

At high currents, the electrical arc in the vacuum switches to a concentrated mode which causes high, localized temperature rises on the contacts. The existence of these hot spots is detrimental to the quick restoring of the dielectric strength. Two techniques can be used in order to avoid this stagnation of the static concentrated arc:
- the so called RMF (Radial Magnetic Field) technique, involves rotating the arc thanks to an electromagnetic effect generated by a radial magnetic field; this therefore limits contact erosion.
- a more recent technique called AMF (Axial Magnetic Field) involves applying an axial magnetic field parallel to the axis of the two contacts (fig. 2) which allows a diffuse arc to be maintained (fig. 3) even at high current values. The arc energy is spread over the whole contact surface area, therefore causing very low levels of erosion.
- Merlin Gerin has chosen this last technique for the Evolis range.

Merlin Gerin's choices for Evolis combined with its industrial expertise provides customer with a highly reliable range of circuit breakers. These products are suitable for the most demanding conditions with the guarantee of full compliance with international standards.

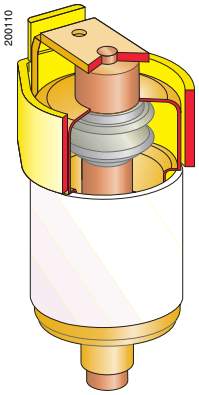

Fig. 4: 17.5 kV external coil type interrupter

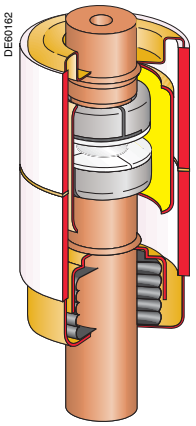

Fig. 5: 24 kV internal coil type interrupter

AMF technology

Evolis circuit breakers use AMF type vacuum interrupters.
According to technical and economic optimization considerations, the axial magnetic field is generated:

- either by a coil outside of the interrupter (fig. 4), for rated voltages up to 17.5 kV
- or by a coil integrated in the interrupter contact structure (fig. 5), for the 24 kV voltage level.

In both cases the AMF vacuum interrupters feature low arc voltages (Uarc of around 50 V) and maximum usage of the contact surface for very low contact erosion.

The advantages provided

The above choices provide customers with the following advantages in MV circuit breaker applications:

- simple and compact vacuum interrupters
- high electrical endurance meaning that there is no need for contact wear inspection in normal network protection applications including highly disturbed overhead line feeders.

Evolis
The very best of vacuum technology
(cont.)

PE55694

Vacuum interrupter

PE55695

Industrial process expertise

Systematic advanced control

The main components of the circuit breaker, such as vacuum interrupter and operating mechanism, are produced by Schneider Electric. The vacuum interrupters are manufactured in an ultra-modern production unit in France.
During manufacture, each circuit breaker is subjected to systematic advanced testing.

Vacuum interrupter testing
The level of vacuum in each interrupter is tested using the “magnetron discharge method”.
Using this sophisticated procedure, measurement is very precise and does not require access to the inside of the interrupter, thus not affecting the airtight seal.

Circuit breaker testing
A rigorous set of tests and measurements is carried out on each circuit breaker. The results are reported and signed off by the quality control department on each device’s test certificate to ensure product traceability.

Compliance with standards

- Evolis complies with IEC 62271-100.
- Design and production are certified to ISO 9001: 2000.
- Production sites are certified to ISO 14001 (environmental standard).

DE55745

AFAQ ISO 9001 VERSION 2000

DE55746

AFAQ ISO 14001

Certification

The certificate of conformity provides guarantees that the circuit breaker:
- has been subject to type tests according to EN 45001 standards procedures in accredited laboratories by independent organizations
- is in conformity with recognized international standards.

Evolis is currently being certified by external EN 45011 accredited organizations, members of the STL (Short circuit Testing Liaison):
- EN 45001: general requirements for the competence of testing and calibration laboratories
- EN 45011: general requirements for bodies of operating product certification systems.

Environmental care

Product design takes account of the environmental constraints described in a “Product Environment Profile” dossier (PEP).

An end-of-service-life manual details procedures for dismantling and processing components.

Guiding TOOLS

merlin-gerin.com

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General contents

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Evolis 24 kV fixed, frontal version 55

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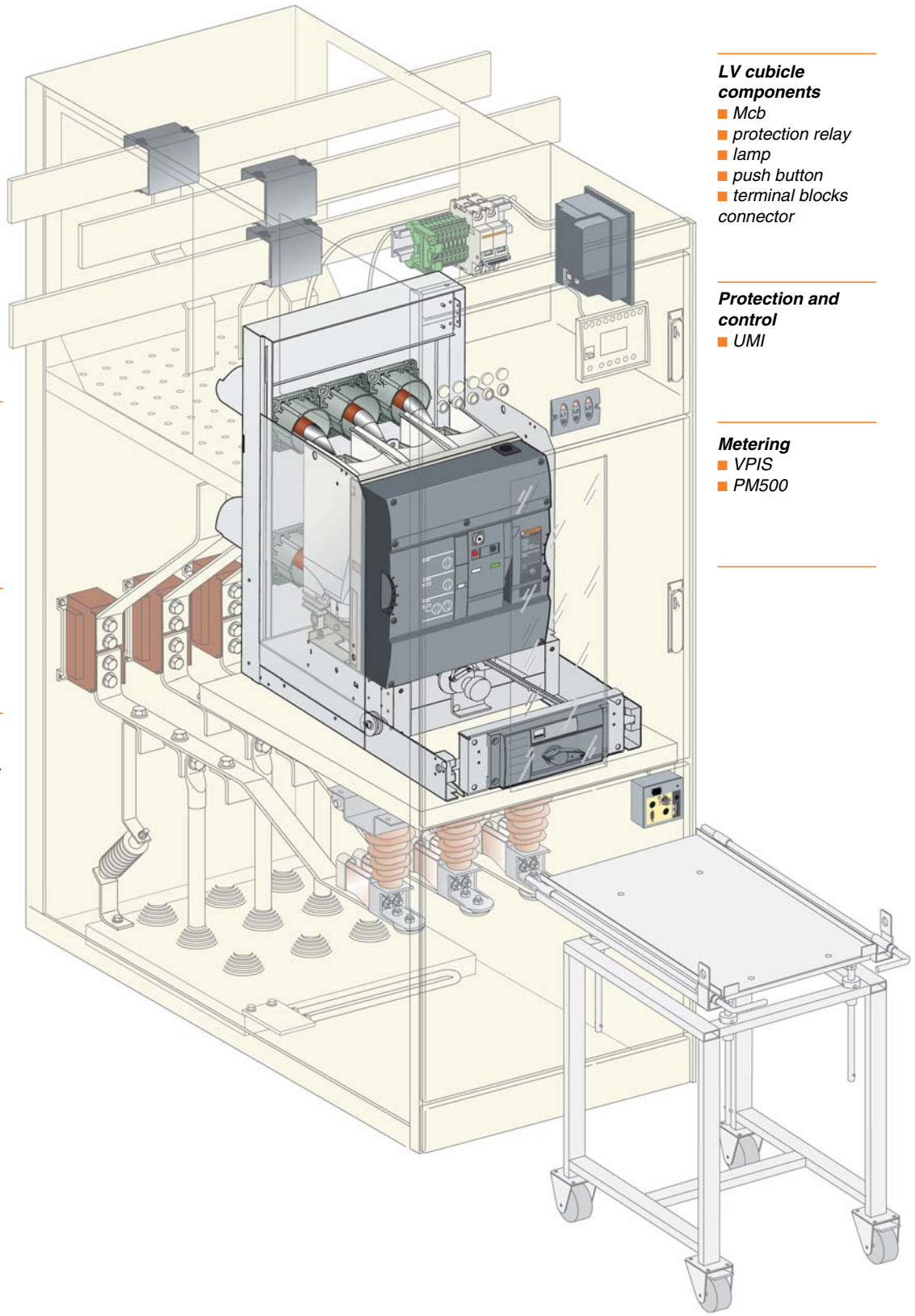
Evolis and EVOset 24 kV fixed, lateral version 89

Evolis Pilot monitoring device 111

Extended products offer

PE55940



Circuit breaker
- *pilot*
- *cradle*

Instrument transformer

MV cubicle components
- *capacitor insulator*
- *earthing switch*
- *heating resistor*
- *voltage presence indicator*
- *crank*
- *extraction table*

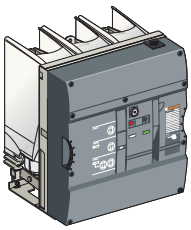
LV cubicle components
- *Mcb*
- *protection relay*
- *lamp*
- *push button*
- *terminal blocks connector*

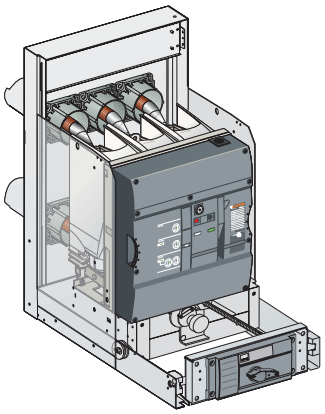
Protection and control
- *UMI*

Metering
- *VPIS*
- *PM500*

Circuit breakers

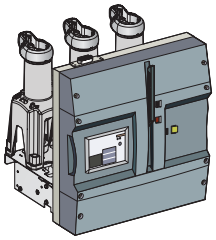
Evolis from 7.2 kV to 17.5 kV

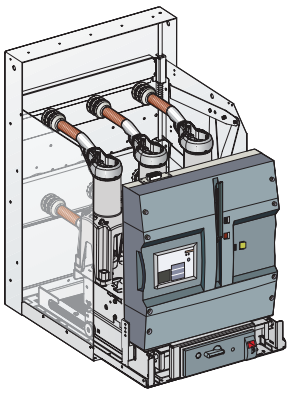




Fixed, frontal version Operating mechanism on the front	Withdrawable, frontal version Operating mechanism on the front
Rated voltage Ur (kV, 50/60 Hz)	
7.2 / 12 / 17.5	7.2 / 12 / 17.5
Short circuit rated breaking capacity (Isc)	
from 25 to 40 kA	from 25 to 40 kA
Rated current (Ir)	
from 630 to 2500 A	from 630 to 2500 A

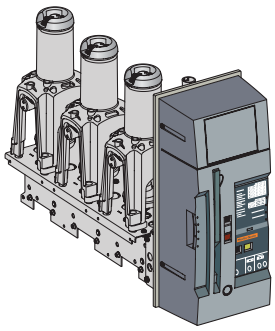
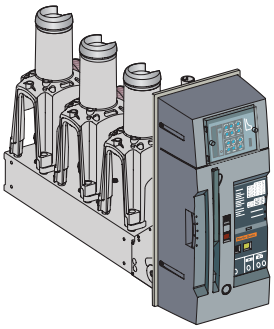
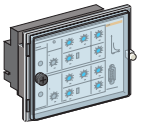
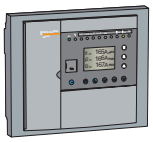
Evolis 24 kV





Fixed, frontal version Operating mechanism on the front	Withdrawable, frontal version Operating mechanism on the front
The “Pilot” option monitors correct circuit breaker operation	The “Pilot” option monitors correct circuit breaker operation
Transparent Ready WEB enabled	Transparent Ready WEB enabled
24	24
from 16 to 31.5 kA	from 16 to 31.5 kA
from 630 to 2500 A	from 630 to 2500 A

Protection, monitoring and control

	EVOset 24 kV	Protection	Protection and control	Metering
				
Fixed, lateral version Operating mechanism on the side The “Pilot” option monitors correct circuit breaker operation Transparent Ready WEB enabled	**Fixed, lateral version** Operating mechanism on the side - Integrated protection system	**VIP30** for phase protection **VIP35** for phase and earthing protection **VIP300P** for phase protection **VIP300LL** for phase and earthing protection	**Sepam series 20** for normal applications **Sepam series 40** for demanding applications **Sepam series 80** for full applications	**PM500, PM700** for basic metering **PM800** for advanced metering **CM3000, CM4000** for full metering and power quality
Rated voltage Ur (kV, 50/60 Hz)				
24	24			
Short circuit rated breaking capacity (Isc)				
from 12.5 to 25 kA	from 12.5 to 20 kA			
Rated current (Ir)				
from 630 to 1250 A	from 630 to 1250 A			

Separate catalogue

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Evolis 17.5 kV fixed, frontal version

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Evolis Pilot monitoring device *111*

Main characteristics

Electrical characteristics according to IEC 62271-100

Ur 7.2 kV	**Isc**	**Ir**			
Phase to phase distance (mm)			**145**	**185**	**240**
Ud 20 kV 50 Hz, 1 min	25 kA	630 A	■	■	
Up 60 kV peak		1250 A	■	■	
		2500 A			■
	31.5 kA	630 A		■	
		1250 A		■	
		2500 A			■
	40 kA	630 A			■
		1250 A			■
		2500 A			■
Ur 12 kV	**Isc**	**Ir**			
Phase to phase distance (mm)			**145**	**185**	**240**
Ud 28 kV 50 Hz, 1 min	25 kA	630 A	■	■	
Up 75 kV peak		1250 A	■	■	
		2500 A			■
	31.5 kA	630 A		■	
		1250 A		■	
		2500 A			■
	40 kA	630 A			■
		1250 A			■
		2500 A			■
Ur 17.5 kV	**Isc**	**Ir**			
Phase to phase distance (mm)			**145**	**185**	**240**
Ud 38 kV 50 Hz, 1 min (*)	25 kA	630 A		■	
Up 95 kV peak		1250 A		■	
		2500 A			■
	31.5 kA	630 A		■	
		1250 A		■	
		2500 A			■
	40 kA	630 A			■
		1250 A			■
		2500 A			■

(*) Ud 42 kV 50 Hz, 1 min possible

Additional characteristics according to IEC 62271-100

Rated values			
Voltage	**Ur**	kV rms	7.2-12-17.5
Insulation voltage:			
- power frequency withstand	**Ud**	kV rms	20-28-38
- lightning impulse withstand	**Up**	kV peak	60-75-95
Frequency	**fr**	Hz	50-60
Short time withstand current	**Ik/tk**	kA	Isc/3 s
Peak withstand current	**Ip**	kA peak	2.5 Isc (50 Hz)
			2.6 Isc (60 Hz)
Short circuit making capacity		kA peak	2.5 Isc (50 Hz)
			2.6 Isc (60 Hz)

Other characteristics		
Operating sequence		O-0.3 s-CO-15 s-CO
		O-0.3 s-CO-3 min-CO
		O-3 min-CO-3 min-CO
Operating times	Opening	< 50 ms
	Breaking	< 60 ms
	Closing	< 65 ms
Mechanical endurance	Class	M2
	Number of switching operations	10000
Electrical endurance	Class	E2
Number of switching operations at full Isc value	25 kA	100
	31.5 kA	50
	40 kA	30
Capacitive current breaking capacity	Class	C1
Operating conditions		–25°C to +40°C
Average relative humidity	Over 24 h	< 95%
	Over 1 month	< 90%

Description of functions
MV connection

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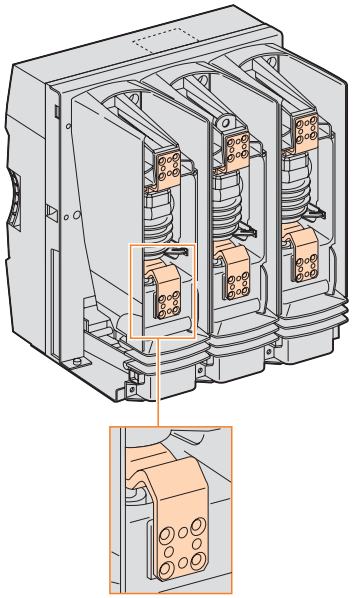

Connection terminal

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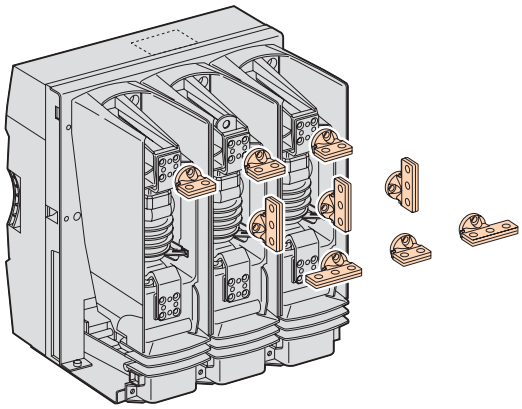


3 connector sets

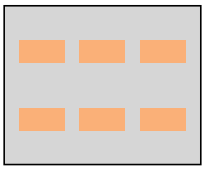
Composition

The basic circuit breaker is equipped with drilled copper connection terminals, at the top and bottom of the breaking units.
The connectors are fitted to the terminals using the corresponding bolts.
Several variants are possible.

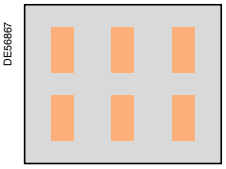
Fixed connectors

Horizontal connectors (H) **Vertical connectors (V)** **Mixed connectors**

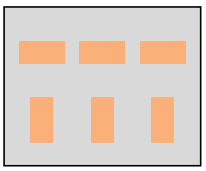
DE58866



DE58867



DE58868

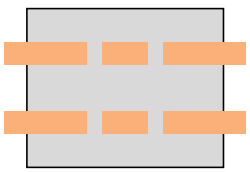


An adjustable connector enables the vertical distance to be increased to enable rotation of 90°.

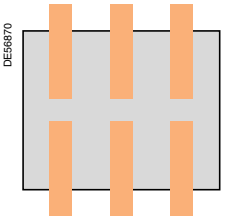
Adjustable gap connectors

Extendable connectors horizontal (H) **Extendable connectors vertical (V)**

DE58869



DE58870

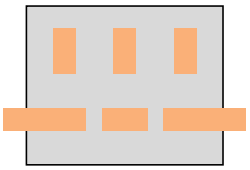


An adjustable connector enables the connection distance to be increased from 0 to 25 mm.

Mixed solution

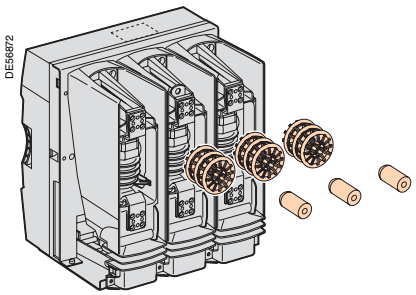
Example

DE56871

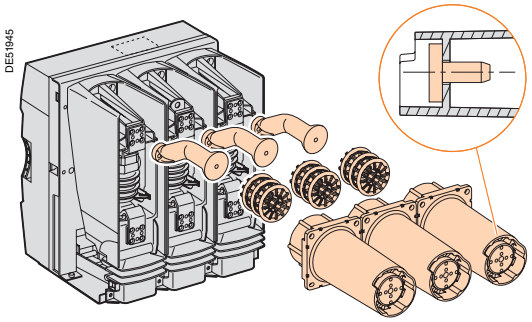


Comment:
The insulation withstand values given in the performance table, do not take account of the connectors.
With these connectors it is possible to use unplated or tin-plated copper conductors or tin-plated aluminium conductors, without any specific precautions being required.
The shape and dimensions of these conductors must be determined by the panel builder according to the dielectric withstand and temperature rise characteristics of the whole connection system.
Typical examples are provided in the Installation Guide.

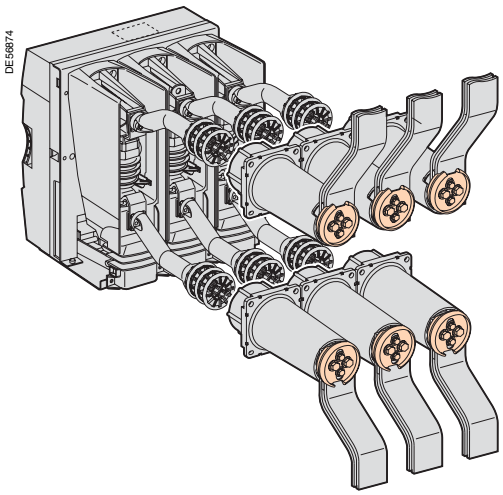
Description of functions
MV connection (cont.)



Clusters and fingers



Arms and bushings



Arms, clusters, fingers and bushings, busbars and field deflectors

Composition
Panels builders with own cubicle designs (including the racking truck) can transform a fixed device into a withdrawable device by adding the following assemblies:
- arms
- clusters
- fingers
- bushings
- field deflectors.

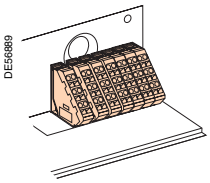
Cluster and finger
- The tulip type cluster has a shape which provides maximum contact surface whilst optimising heat dissipation. Moreover, in the case of short-circuit, it offers good compensation characteristics for electrodynamic forces.
- The finger is a component designed specifically for the cluster, regarding its shape, tolerances and materials. Contact between the finger and the cluster is guaranteed by type testing: 1000 racking in-out operations.

Arm and bushing
- The arms cylindrical shape optimizes dielectric strength and avoids the need for any additional insulation.
- The bushing's cylindrical shape gives it outstanding dielectric strength.
- The previously described connectors can be mounted on bushing connection terminals.

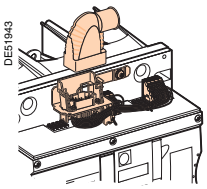
Comment:
Performance levels of the whole assembled unit must be tested by the panel builder. Installation conditions for the two units presented above are described in the Installation Guide. For the 17.5 kV withdrawable circuit breaker, phase to phase distance 185 mm, field deflectors must be added to the bushings.

Field deflectors
For circuit breakers with a rated voltage of Ur = 17.5 kV with a phase to phase distance of 185 mm, field deflectors are used to increase the dielectric strength by 75 kV to 95 kV.

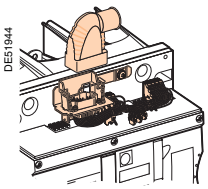
Description of functions
LV connection



LV terminal block



18-pin version LV plug



42-pin version LV plug

Two connection solutions

Directly on the LV terminal block
The circuit breaker's LV wiring can be directly connected to the LV terminal block of the operating mechanism through a cable protection duct.

With LV plug
- The fixed part (male) mounted on the circuit breaker and fully connected to the operating mechanism
- The mobile part (female) compatible with the male part.

Two versions of the LV plug are available

An 18-pin version, enabling connection of:
- a shunt opening release MX1
- a remote control mechanism (electrical motor, shunt closing release XF, anti-pumping relay)
- a "ready to close" contact PF
- a maximum number of auxiliary contacts: 1 NC - 1 NO - 2 changeover contacts.

(see "indication" page, "Open/closed position auxiliary contacts" chapter).

A 42-pin version, enabling connection of:
- an opening release (shunt type MX1 or undervoltage type MN)
- a second opening release (shunt type MX2 or undervoltage type MN)
- a low energy release (Mitop)
- a fault trip indicator contact SDE
- a remote contact reset system SDE
- a remote control mechanism (electrical motor, shunt closing release XF)
- a "ready to close" contact PF
- a maximum number of auxiliary contacts: 4 NC - 5 NO - 2 changeover contacts.

(see "indication" page, "Open/closed position auxiliary contacts" chapter).

***Note:** see the table of the releases' combinations "Order form" page.*

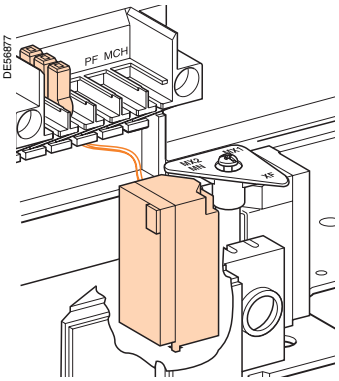
LV wiring kit
A wiring kit with 21 or 42 wires (2 meters long) equipped with pins that can be adapted to the LV plug can be supplied for connected in to the cubicle's LV compartment.

Flexible ducting
This 525 mm long duct with a hinged LV plug, enables protection of the LV wiring that connects the circuit breaker to the cubicle's LV compartment.

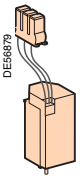
Interlocking kit
For circuit breakers intended for withdrawable applications, an interlocking kit can be adapted. The kit enables the mechanical position status to be given ("connected/disconnected") of the LV plug. By adding a link between this mechanical data (by the customer) and the open/closed position of the circuit breaker, interlocking can be achieved between the LV plug and the open/closed position of the circuit breaker (required by IEC standard 62271-200).

A detailed explanation of operation is given in the Installation Guide.

Description of functions
Opening circuit



Circuit breaker equipped with a shunt opening release MX



Shunt opening release (MX1 and MX2)

Composition

The opening circuit is produced using the following components:
- a shunt opening release (MX1)
- a second shunt opening release (MX2)
- an undervoltage release (MN)
- time delayed undervoltage release (MNR: MN + time delay).

The time delay, placed outside the circuit breaker, can be disabled by an emergency stop button to give instant circuit breaker opening.
- low energy release (Mitop).

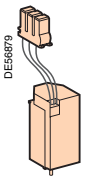
Note: *see the table of the releases' combinations on the following page.*

Shunt opening release (MX1 and MX2)

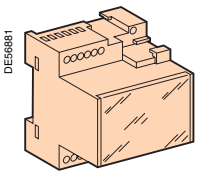
Energizing this release causes instant opening of the circuit breaker.
Permanent power supply to the MX unit locks the circuit breaker in the "open" position.

Characteristics		
Power supply	See "Order form" page	
Threshold	0.7 to 1.1 Un	
Consumption (VA or W)	Triggering	200 (for 200 ms)
	Latched	4.5

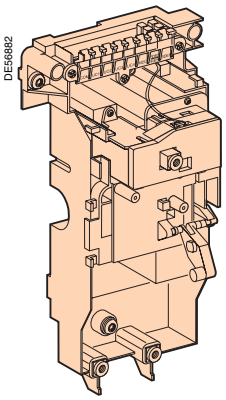
Description of functions
Opening circuit (cont.)



Undervoltage release (MN)



Time delay for undervoltage release (MN)



Low energy release (Mitop)

Undervoltage release (MN)

This release unit causes the systematic opening of the circuit breaker when its supply voltage drops below a value less than 35% of the rated voltage, even if this drop is slow and gradual. It can open the circuit breaker between 35% and 70% of its rated voltage. If the release unit is not supplied power, manual or electrical closing of the circuit breaker is impossible. Closing of the circuit breaker is possible when the supply voltage of the release unit reaches 85% of its rated voltage.

Characteristics		
Power supply	See “Order form” page	
Threshold	Opening	0.35 to 0.7 Un
	Closing	0.85 Un
Consumption (VA or W)	Triggering	200 (for 200 ms)
	Latched	4.5

Time delay for MN

To eliminate spurious tripping of the circuit breaker when there are brief voltage drops, the MN action is controlled with a time delay.
This function is achieved by adding a time delay unit outside of the undervoltage release (MN) circuit (adjustable time delay).
This unit is placed outside the circuit breaker and can be inhibited by an emergency stop button to obtain instant circuit breaker opening.

Characteristics		
Power supply	See “Order form” page	
Threshold	Opening	0.35 to 0.7 Un
	Closing	0.85 Un
Consumption (VA or W)	Triggering	200 (for 200 ms)
	Latched	4.5
Time delay	0.5 s - 0.9 s - 1.5 s - 3 s	

Low energy release (Mitop)

This release includes a low consumption unit and is specifically used with the Sepam 100LA self-powered unit (“REFLEX MODULE”), or the VIP relay.

Characteristics	
Power supply	Direct current
Threshold	0.6 A < I < 3 A

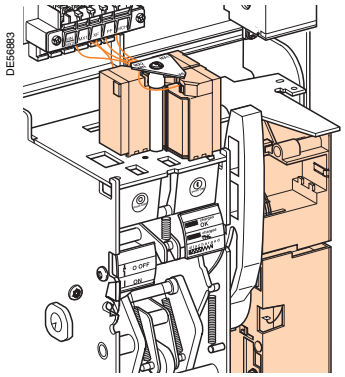
Any tripping due to the Mitop release unit is momentarily indicated by an SDE type changeover contact.
This release also includes a coil (reset) enabling remote SDE contact reset.

Comment:
Use of the Mitop low energy release requires adjustment of the protection relay time delay in order to ensure that the circuit breaker trips between 45-50 ms.

Releases combinations table

Shunt opening MX1	1			1	1	1		1	1
Shunt opening MX2				1				1	
Undervoltage MN		1			1		1		1
Mitop			1			1	1	1	1

Description of functions
Remote control



Circuit breaker equipped with remote control

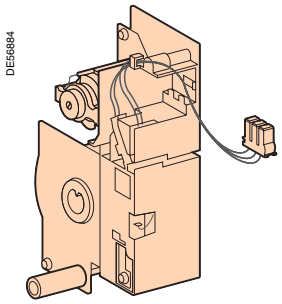
Function

Remote control enables the remote opening and closing of the circuit breaker.

The opening order always takes priority over the closing order.
In the event of simultaneous opening and closing orders, the mechanism discharges under no load, without moving the main contacts. The circuit breaker remains in the “open” position.
In the event of latched opening and closing orders, the mechanism carries out anti-pumping function as standard, by blocking the circuit breaker in the “open” position.
Anti-pumping function: after opening on a fault or deliberate opening via the manual or electrical mechanism, the closing order must be interrupted then reactivated to enable reclosing of the circuit breaker.

Composition

The remote control comprises:
- an electrical motor (MCH) equipped with a “spring armed” limit switch
- a shunt closing release (XF).

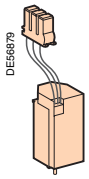


Electrical motor MCH

Electrical motor (MCH)

The electrical motor carries out the automatic rearming of the storage energy springs as soon as the circuit breaker closes. This allows instant reclosing of the device after opening. The arming lever is only used as a backup control in the case of the absence of the auxiliary power supply.
An electrical motor (MCH) equipped with a “spring armed” limit switch.
This contact indicates the “armed” position of the mechanism (springs armed).

Characteristics	
Power supply	See “Order form” page
Threshold	0.85 to 1.1 Un
Consumption (VA or W)	180
Motor overcurrent	2 to 3 In for 0.1 s
Arming time	6 s maximum
Operating rate	3 cycles maximum per minute
CH contact	10 A/240 V



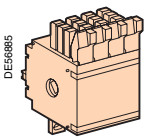
Shunt closing release XF

Shunt closing release (XF)

This release allows remote closing of the circuit breaker when the control mechanism is armed. It can be permanently or briefly supplied power.

XF characteristics		
Power supply	See “Order form” page	
Threshold	XF	0.85 to 1.1 Un
Consumption (VA or W)	Triggering	200 (for 200 ms)
	Latched	4.5

Description of functions
Indication



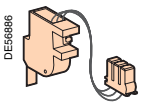
Rotary type contacts (OC)

"Open/closed" auxiliary position contacts (OC)

These auxiliary contacts indicate the "open" or "closed" position of the circuit breaker.
■ Rotary type changeover contacts directly controlled by the circuit breaker mechanism.
■ Indicator contacts are proposed:
□ for standard relaying applications
□ for low level control applications with plc's or electronic circuits.
This version is compatible with Sepam series 20-40-80 units.

Characteristics			
Standard delivery			4
Maximum quantity			12
Breaking capacity (A)	Standard		Min. load: 100 mA/24 V
Cos φ: 0.3	V AC	240/380	10/6*
AC12/DC12		480	10/6*
		690	6
	V DC	24/48	10/6*
		125	10/6*
		250	3
	Low level		Min. load: 2 mA/15 V DC
	V AC	24/48	6
		240	6
		380	3
	V DC	24/48	6
		125	6
		250	3

* Standard contacts: 10 A; optional contacts: 6 A (temperature derating)

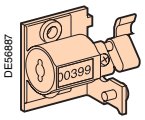


"Ready to close" PF contact

"Ready to close" PF contact

The circuit breaker is "ready to close" when shown by a mechanical indicator and a PF changeover contact.
This information simultaneously indicates that:
■ the circuit breaker is open
■ the storage energy springs are armed
■ there is no permanent closing order
■ there is no permanent opening order caused by:
□ a safety opening order (2nd MX or MN)
□ keylocking of the device in the open position.

Characteristics			
Standard delivery			0
Maximum quantity			1
Breaking capacity (A)	Standard		Min. load: 100 mA/24 V
Cos φ: 0.3	V AC	240/380	5
AC12/DC12		480	5
		690	3
	V DC	24/48	3
		125	0.3
		250	0.15
	Low level		Min. load: 2 mA/15 V DC
	V AC	24/48	3
		240	3
		380	3
	V DC	24/48	3
		125	0,3
		250	0,15

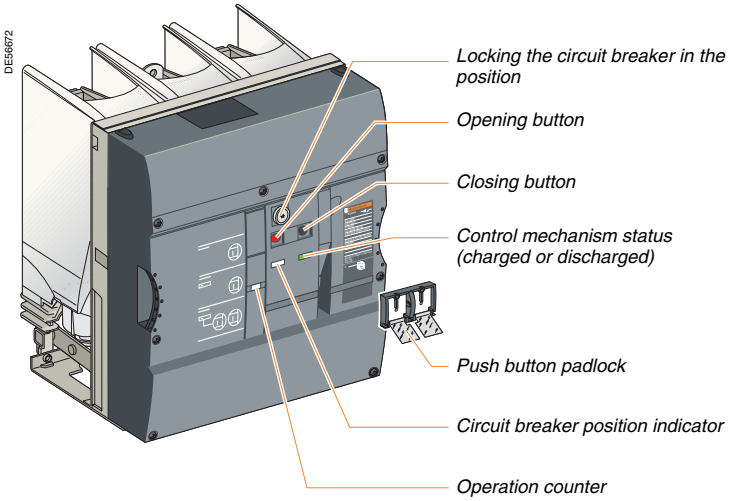


Operation counter (CDM)

Operation counter (CDM)

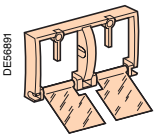
The operation counter is visible on the front panel.
It totalizes the number of switching cycles (CO) that the device has carried out.

Description of functions
Locking/interlocking

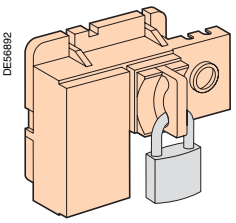


Push button padlock

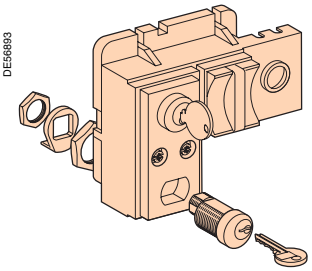
This transparent screen blocks access to the opening and closing push-buttons on the circuit breaker.
The device enables the opening or closing push button to be locked independently. It is often associated with an electrical motor (MCH).
Locking is achieved either:
- by 2 screws
- by 3 padlocks, not supplied
- by a lead seal.



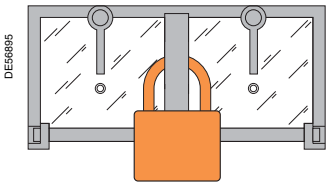
Push button padlock



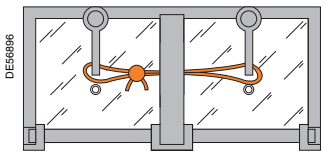
Padlocking of the circuit breaker in the “open” position



Keylocking of the circuit breaker in the “open” position



Padlocking



Lead sealing

Locking of the circuit breaker in the “open” position

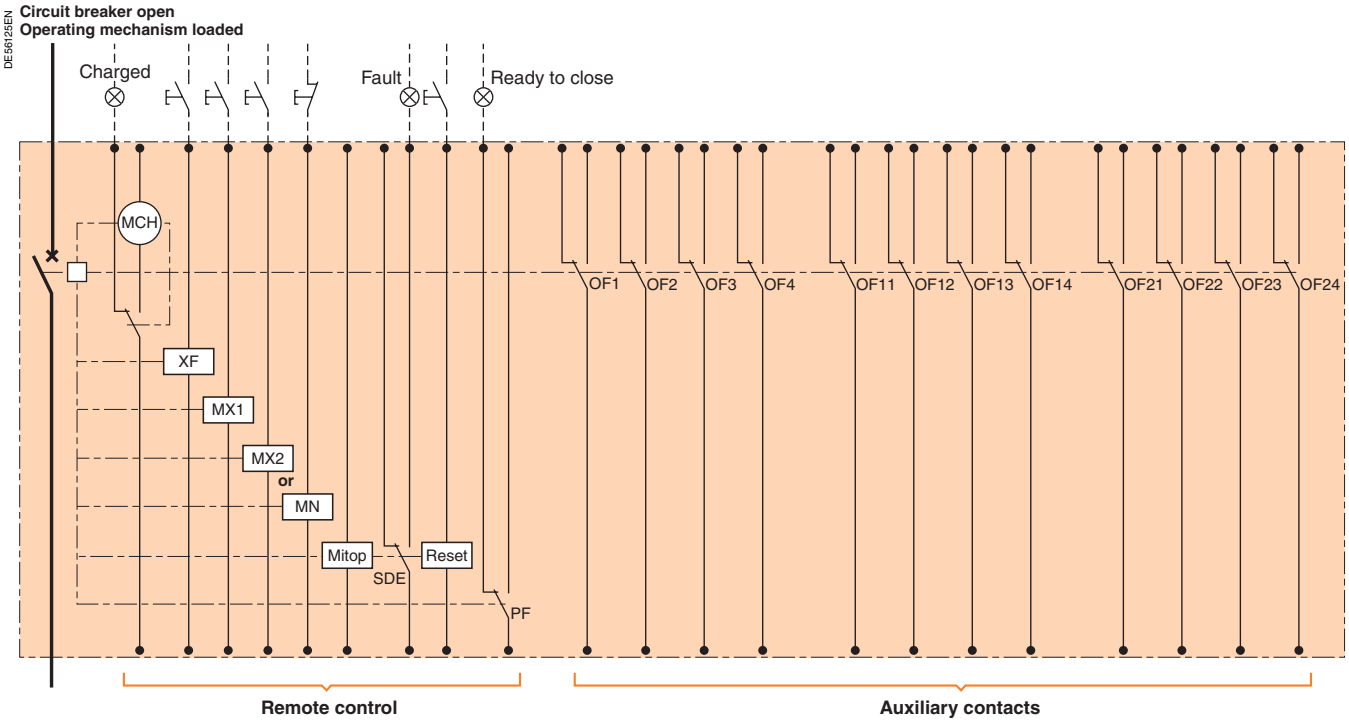
The circuit breaker is locked in the “open” position by blocking the opening push button in the engaged position:
- by a padlock 1 to 3 padlocks, not supplied
- by a keylocks 1 or 2 different keylocks, not supplied

The keylocks are of captive key type, with the key free after locking, either Profalux or Ronis (right turn), and are proposed according to the options either with:
- 1 single keylock
- 1 single keylock mounted on the circuit breaker + 1 identical delivered separately for interlocking with another device
- 2 different keylocks for double locking.

Profalux and Ronis keylocks are inter-compatible.

Description of functions
Wiring diagram

Wiring diagram (principle)



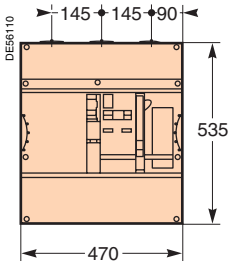
MCH: electrical motor
XF: shunt closing release
MX1: shunt opening release
MX2: shunt opening release
***or** MN: undervoltage release*
Mitop: low energy release
SDE: electrical fault signal contact
Reset: remote SDE contact reset
PF: "ready to close" contact

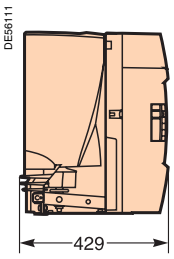
Dimensions

Device:

Phase to phase distance 145 mm

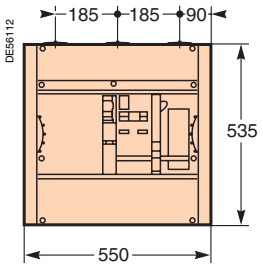
Ur	Isc	Ir	Weight
7.2 kV	25 kA	630 A	51 kg
		1250 A	
12 kV	25 kA	630 A	
		1250 A	

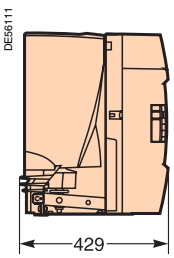




Phase to phase distance 185 mm

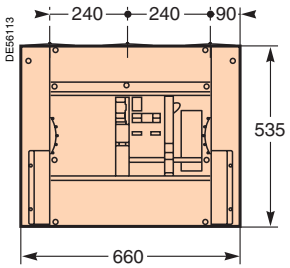
Ur	Isc	Ir	Weight
7.2 kV	25 kA	630 A	55 kg
		1250 A	
	31.5 kA	630 A	
		1250 A	
12 kV	25 kA	630 A	
		1250 A	
	31.5 kA	630 A	
		1250 A	
17.5 kV	25 kA	630 A	
		1250 A	
	31.5 kA	630 A	
		1250 A	

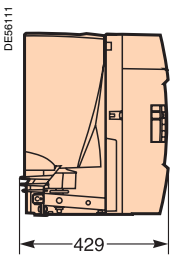




Phase to phase distance 240 mm

Ur	Isc	Ir	Weight
7.2 kV	25 kA	2500 A	79 kg
	31.5 kA	2500 A	
	40 kA	630 A	
		1250 A	
		2500 A	
12 kV	25 kA	2500 A	
	31.5 kA	2500 A	
	40 kA	630 A	
		1250 A	
		2500 A	
17.5 kV	25 kA	2500 A	
	31.5 kA	2500 A	
	40 kA	630 A	
		1250 A	
		2500 A	





Important
Detailed installation instructions are given in the “Evolis Installation Guide”. Please consult us.

Order form

Only one of the boxes (ticked [X] or filled [ ] by the needed value) have to be considered between each horizontal line.
Orange box [X] corresponds to none priced functions.

Basic fixed, frontal circuit breaker

Quantity [ ]

Rated voltage Ur (kV) [ ]

Rated short-circuit breaking current Isc (kA) [ ]

Rated normal current Ir (A) [ ]

Phase distance (mm) 145 [ ] 185 [ ] 240 [ ]

Colour for push buttons and indicators IEC standard [ ] ANSI standard [ ]

Circuit breaker options

1st opening release (see possible choices in combination table below)

Shunt opening release - **MX1**

24 Vac [ ] 24…30 Vdc [ ] 100…130 Vdc/ac [ ]
48 Vac [ ] 48…60 Vdc [ ] 200…250 Vdc/ac [ ]

Undervoltage release - **MN**

24 Vac [ ] 24…30 Vdc [ ] 100…130 Vdc/ac [ ]
48 Vac [ ] 48…60 Vdc [ ] 200…250 Vdc/ac [ ]

Time delay unit for **MN**

48…60 Vdc/ac [ ] 100…130 Vdc/ac [ ] 200…250 Vdc/ca [ ]

Low energy release **Mitop**
1 AC fault signalling SDE and reset 200...250 Vac are included [ ]

2nd opening release (a low voltage plug and socket 42 pins is mandatory)

Shunt opening release - **MX2**

24 Vac [ ] 24…30 Vdc [ ] 100…130 Vdc/ac [ ]
48 Vac [ ] 48…60 Vdc [ ] 200…250 Vdc/ac [ ]

Undervoltage release - **MN**

24 Vac [ ] 24…30 Vdc [ ] 100…130 Vdc/ac [ ]
48 Vac [ ] 48…60 Vdc [ ] 200…250 Vdc/ac [ ]

Time delay unit for **MN**

48…60 Vdc/ac [ ] 100…130 Vdc/ac [ ] 200…250 Vdc/ac [ ]

Low energy release **Mitop**
1 AC fault signalling SDE and reset 200...250 Vac are included [ ]

Remote control

Electrical motor - **MCH**

24…30 Vdc [ ] 100…125 Vdc [ ] 200…250 Vdc [ ]
48…60 Vdc/ac [ ] 100…130 Vac [ ] 200…240 Vac [ ]

Shunt closing release - **XF**

24 Vdc [ ] 24…30 Vdc [ ] 100…130 Vdc/ac [ ]
48 Vdc [ ] 48…60 Vdc [ ] 200…250 Vdc/ac [ ]

Operation counter CDM [ ]

Additional auxiliary contacts OF (4 AC) 1 [ ] 2 [ ]

Ready to close contact PF (1 AC) [ ]

LV plug 18 pins LV plug [ ] 42 pins LV plug [ ] LV terminal blocks [ ]

Locking of the circuit breaker in the open position

By padlock [ ]
or by locks and keys Profalux [ ] Ronis [ ]
If locks 1 lock [ ] 2 identical locks [ ] 2 different locks [ ]

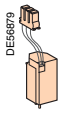
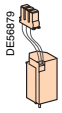
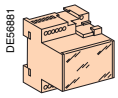
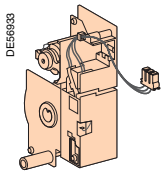
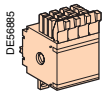
Push buttons padlock [ ]

Releases combinations table

Shunt opening MX1	1			1	1	1		1	1
Shunt opening MX2				1				1	
Undervoltage MN		1			1		1		1
Mitop			1			1	1	1	1

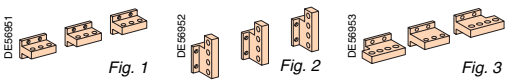
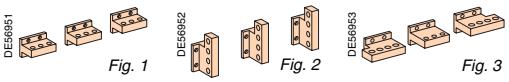
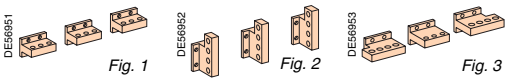
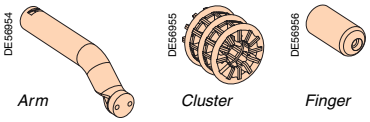
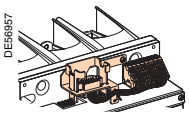
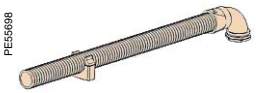
Offer structure
Separated components

The following components can be ordered separately and can be adapted or replaced by the customer.

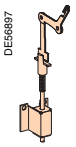
Remote control and opening circuit			Ref.
MX1, MX2, XF shunt opening/closing release			
 DE56879	24…30 Vdc	24 V 50/60 Hz	**59284**
	48…60 Vdc	48 V 50/60 Hz	**59285**
	100…130 Vdc - 50/60 Hz		**59286**
	200…250 Vdc - 50/60 Hz		**59287**
MN undervoltage release			
 DE56879	24…30 Vdc	24 V 50/60 Hz	**59288**
	48…60 Vdc	48 V 50/60 Hz	**59289**
	100…130 Vdc - 50/60 Hz		**59290**
	200…250 Vdc - 50/60 Hz		**59291**
Time delay for MN			
 DE56881	48…60 Vdc - 50/60 Hz		**33680**
	100…130 Vdc - 50/60 Hz		**33681**
	200…250 Vdc - 50/60 Hz		**33682**
MCH electrical motor			
 DE56933	24…30 Vdc		**47888**
	48…60 Vdc		**47889**
	100…125 Vdc		**47890**
	200…250 Vdc		**47891**
	48…60 V - 50/60 Hz		**47889**
	100…130 V - 50/60 Hz		**47893**
	200…240 V - 50/60 Hz		**47894**
Additional auxiliary contacts			
 DE56885	4 AC		**47887**
LV terminal blocks			
DE56958	1 terminal block		**47074**

Offer structure
Separated components (cont.)

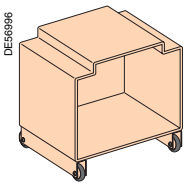
MV and LV connection accessories

		Ref.
Upstream and downstream fixed connections, Ir		
 *Fig. 1* *Fig. 2* *Fig. 3*	3 fixed distance H or V *(fig. 1)*	630-1250 A **59400**
	3 variable distance H *(fig. 3)*	630-1250 A **59401**
	3 variable distance V *(fig. 2)*	630-1250 A **59402**
Upstream fixed connections, Ir		
 *Fig. 1* *Fig. 2* *Fig. 3*	3 fixed distance H or V *(fig. 1)*	630-2500 A **59403**
	3 variable distance H *(fig. 3)*	630-2500 A **59404**
	3 variable distance V *(fig. 2)*	630-2500 A **59405**
Downstream fixed connections, Ir		
 *Fig. 1* *Fig. 2* *Fig. 3*	3 fixed distance H or V *(fig. 1)*	630-2500 A **59409**
	3 variable distance H *(fig. 3)*	630-2500 A **59410**
	3 variable distance V *(fig. 2)*	630-2500 A **59411**
MV connection accessories		
 *Arm* *Cluster* *Finger*	3 clusters + 3 fingers	630-1250 A **59369**
	3 clusters + 3 fingers	630-2500 A **59371**
	3 arms	630-1250 A **59396**
	3 arms	630-2500 A **59397**
Field deflectors for bushings		
	6 deflectors used to increase dielectric withstand from 75 to 95 kV	**59283**
LV plug		
	Standard (18 pins)	**59114**
	All options (42 pins)	**59115**
Conductor for wiring		
	Flexible conduct for LV wiring	**59099**
	LV connecting kit 21 wires	**59117**
	LV connecting kit 42 wires	**AAA10 087**

Other circuit breaker accessories

		Ref.
Labels kit for push button and indicator (O/C)		
	Circuit breaker specific labels green, red, etc.	**59100**
Circuit breaker opening external device		
	Adaptation kit needed for circuit breaker opening (for retrofit)	**59093**

Various

		Ref.
Circuit breaker support frame		
	Drawings and casters	**59050**
Technical documentation		
	User manual	**59069**

Services

The following components can only be adapted or replaced on site by staff trained by Schneider Electric:

- remote control mechanism (comprising: electrical motor, shunt closing release, operation counter)
- operation counter
- low energy release (Mitop)
- circuit breaker front cover.

Guiding TOOLS

merlin-gerin.com

This international site allows you to access all the Merlin Gerin products in just 2 clicks via comprehensive range data-sheets, with direct links to:

- complete library: technical documents, catalogs, FAQs, brochures…
- selection guides from the e-catalog.
- product discovery sites and their Flash animations.

You will also find illustrated overviews, news to which you can subscribe, the list of country contacts…

Training

Training allows you to acquire the Merlin Gerin expertise (installation design, work with power on, etc.) for increased efficiency and a guarantee of improved customer service.
The training catalogue includes beginner's courses in electrical distribution, knowledge of MV and LV switchgear, operation and maintenance of installations, design of LV installations to give but a few examples.

Evolis 17.5 kV withdrawable, frontal version

Panorama 13
Evolis 17.5 kV fixed, frontal version 17

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Services **52**

Evolis 24 kV fixed, frontal version 55
Evolis 24 kV withdrawable, frontal version 69
Evolis and EVOset 24 kV fixed, lateral version 89
Evolis Pilot monitoring device 111

Main characteristics

PE55939

Electrical characteristics according to IEC 62271-100

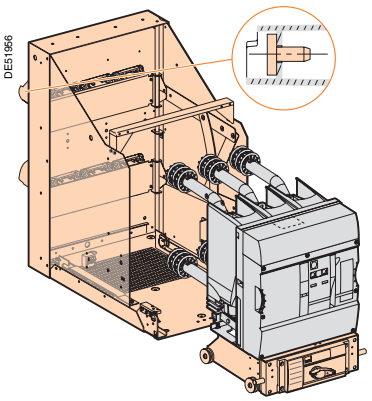
Ur 7.2 kV	**Isc**	**Ir**			
Phase to phase distance (mm)			**145**	**185**	**240**
Ud 20 kV 50 Hz, 1 min	25 kA	630 A	■	■	
Up 60 kV peak		1250 A	■	■	
		2500 A			■
	31.5 kA	630 A		■	
		1250 A		■	
		2500 A			■
	40 kA	630 A			■
		1250 A			■
		2500 A			■
Ur 12 kV	**Isc**	**Ir**			
Phase to phase distance (mm)			**145**	**185**	**240**
Ud 28 kV 50 Hz, 1 min	25 kA	630 A	■	■	
Up 75 kV peak		1250 A	■	■	
		2500 A			■
	31.5 kA	630 A		■	
		1250 A		■	
		2500 A			■
	40 kA	630 A			■
		1250 A			■
		2500 A			■
Ur 17.5 kV	**Isc**	**Ir**			
Phase to phase distance (mm)			**145**	**185**	**240**
Ud 38 kV 50 Hz, 1 min	25 kA	630 A		■	
Up 95 kV peak		1250 A		■	
		2500 A			■
	31.5 kA	630 A		■	
		1250 A		■	
		2500 A			■
	40 kA	630 A			■
		1250 A			■
		2500 A			■

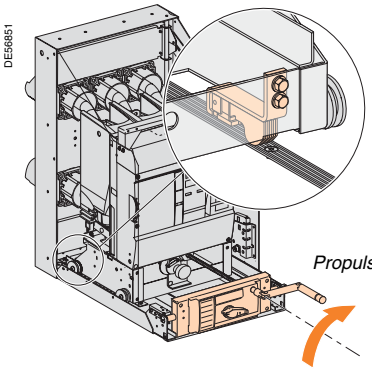
Additional characteristics according to IEC 62271-100

Rated values			
Voltage	**Ur**	kV rms	7.2-12-17.5
Insulation voltage:			
- power frequency withstand	**Ud**	kV rms	20-28-38
- lightning impulse withstand	**Up**	kV peak	60-75-95
Frequency	**fr**	Hz	50-60
Short time withstand current	**Ik/tk**	kA	Isc/3 s
Peak withstand current	**Ip**	kA peak	2.5 Isc (50 Hz)
			2.6 Isc (60 Hz)
Short circuit making capacity		kA peak	2.5 Isc (50 Hz)
			2.6 Isc (60 Hz)

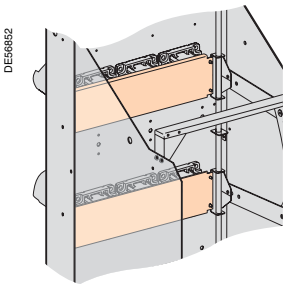
Other characteristics		
Operating sequence		O-0.3 s-CO-15 s-CO
		O-0.3 s-CO-3 min-CO
		O-3 min-CO-3 min-CO
Operating times	Opening	< 50 ms
	Breaking	< 60 ms
	Closing	< 65 ms
Mechanical endurance	Class	M2
	Number of switching operations	10000
Electrical endurance	Class	E2
Number of switching operations at full Isc value	25 kA	100
	31.5 kA	50
	40 kA	30
Capacitive current breaking capacity	Class	C1
Operating conditions		–25°C to +40°C
Average relative humidity	Over 24 h	< 95%
	Over 1 month	< 90%

Description of functions
Racking in

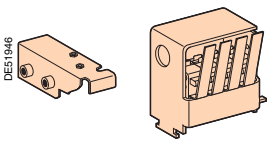




Propulsion system

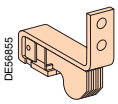


Shutters

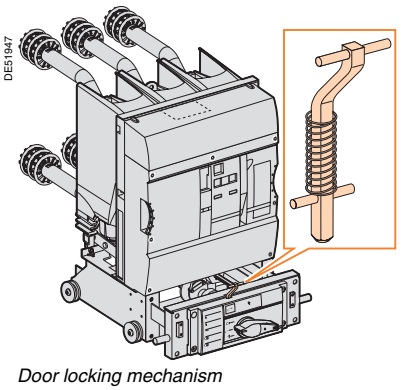


Circuit breaker position contact locked

Racked in/out contacts



Earthing sliding device



Door locking mechanism

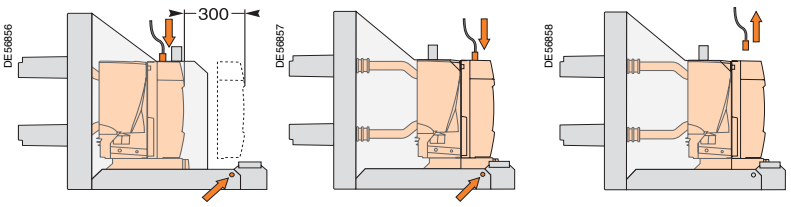
Composition

The “racking in” function is carried out by:
- the racking truck supporting the circuit breaker (mobile part)
- the cradle with bushings (fixed part)
- LV plug.

Operation

The circuit breaker can be placed in 3 stable positions:
- **service position:** circuit breaker racked in and locked in position; LV plugs connected
- **test position:** circuit breaker racked out and locked in position; LV plug connected
- **disconnected position:** the circuit breaker can be unlocked and extracted from the cradle.

3 stable states for operating



Service position *Test position* *Disconnected position*

***Note:** the arrows show the “locked positions” for the circuit breaker and the LV plug.*

Functions

- A drive system combined with a threaded shaft gives easier racking in and out.

The racking in mechanism can be operated with the door closed.
An interlock stops the user from inserting the lever as long as the racking truck has not been put in the “racked in/out” position.

- An interlock between the circuit breaker status and the truck gives secure operation: racking in or out is only possible if the circuit breaker is open.
- An interlock also exists between the LV connector and the truck. It is only possible to rack in if the LV connector is connected.

The cradle floor has all the fixing holes needed to correctly position the earthing switch control mechanism and power circuit. This makes earthing switch operation reliable and gives interlocking between the circuit breaker and the earthing switch.

- Earthing is automatic when the truck is fully racked in.
- Protective shutters stop fingers from touching the racking clusters when the device is extracted (protection index: IP2X).
- For maintenance operations, it is possible to:
  - padlock the shutters in the closed position
  - unlock the shutter mechanism to access the racking clusters.
- A foolproof device enables correct matching of the cradle and circuit breaker rating.

This system is mounted on the cradle base. Part of the system must be assembled by the panel builder on the cubicle floor.

Accessories

- One set of auxiliary contacts:
  - 4 circuit breaker racked in/out position contacts
  - 1 contact showing that the circuit breaker is locked in place on the cradle.
- Cradle earthing is provided by a sliding copper contact.
- A key locking system (Ronis or Profalux) for the circuit breaker in the racked out position enables increased safety downstream of it during work.

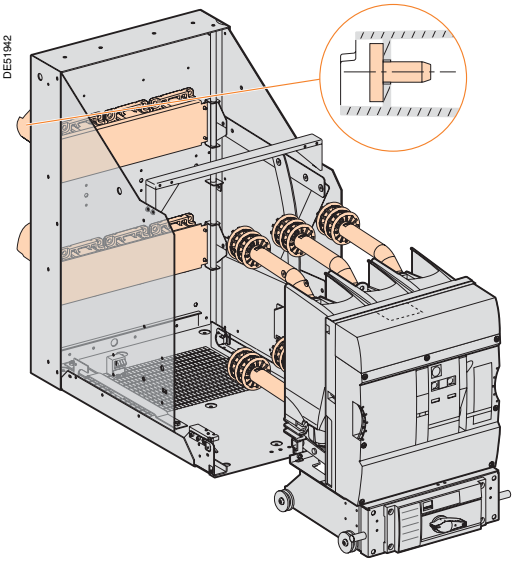
This system is associated with an earthing switch.

- Locking of the circuit breaker compartment door.

This device enables the circuit breaker, full version, to only be operated when the door is closed.

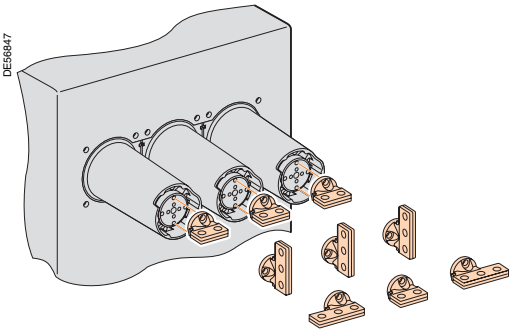
Description of functions
MV connection

DE51942



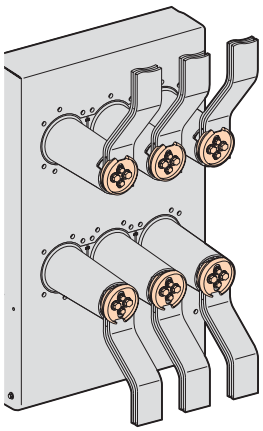
Power circuit

DE56847



3 connector sets

DE56849



Field deflectors

Composition

The power circuit comprises:
- mobile contacts with disconnectable clusters and arms mounted on the circuit breaker
- fingers attached to the cradle and insulated by bushings and metal shutters.

This assembly provides perfect control of the dielectric strength, mechanic, the short time withstand current and the temperature rise.
All of these characteristics have been validated in tests.

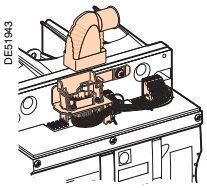
Connection

Connection is easily done from outside the cradle:
- on vertical copper terminals integrated in the bushing
- by a connector set, also used on the base circuit breaker.

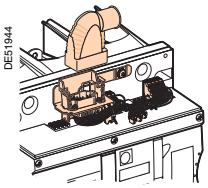
Note:
The dielectric strength values given in the performance table, do not take these connectors into account.
The panel builder must check the whole cubicle connection configuration.

For circuit breakers with a rated voltage of Ur = 17.5 kV with a phase to phase distance of 185 mm, field deflectors are used to increase the dielectric strength by 75 kV to 95 kV.

Description of functions
LV connection



18-pin version LV plug



42-pin version LV plug

Main functions

With the base circuit breaker, the LV wiring uses a LV plug which comprises:
- the fixed part (male) mounted on the circuit breaker and fully connected to the control mechanism
- the mobile part (female) compatible with the male part.

Two versions of the LV plug are available

An 18-pin version, enabling connection of:
- a shunt opening release MX1
- a remote control mechanism (electrical motor, shunt closing release XF)
- a “ready to close” contact PF
- a maximum number of auxiliary contacts: 1 NC - 1 NO - 2 changeover contacts.

(see “indication” page, “Open/closed position auxiliary contacts” chapter).

An 42-pin version, enabling connection of:
- a shunt opening release MX1
- a second opening release (shunt type MX2 or undervoltage type MN)
- a low energy release (Mitop)
- a fault trip indicator contact SDE
- a remote contact reset system SDE
- a remote control mechanism (electrical motor, shunt closing release XF)
- a “ready to close” contact PF
- a maximum number of auxiliary contacts: 4 NC - 5 NO - 2 changeover contacts.

(see “indication” page, “Open/closed position auxiliary contacts” chapter).

***Note:** see the table of the releases’ combinations “Order form” page.*

Interlocking function:
In conformity with IEC standard 62271-200, an interlocking function prohibits:
- racking in when the LV plug is not connected
- disconnection of the LV plug if the circuit breaker is in the racked-in position.

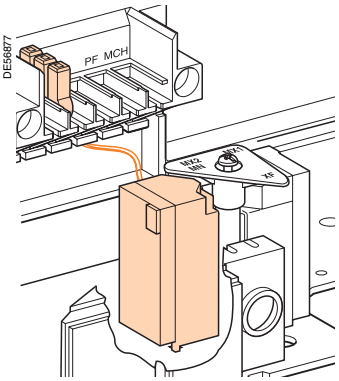
LV wiring kit

A wiring kit with 21 or 42 wires (2 meters long) equipped with pins that can be adapted to the LV plug can be supplied for connected in to the cubicle’s LV compartment.

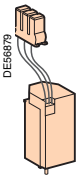
Flexible ducting

This 525 mm long duct with a hinged LV plug, enables protection of the LV wiring that connects the circuit breaker to the cubicle’s LV compartment.

Description of functions
Opening circuit



Circuit breaker equipped with a shunt opening release MX



Shunt opening release (MX1 and MX2)

Composition

In its basic version, the circuit breaker includes a shunt opening release (MX1)
The opening circuit can also be produced using the following components:
- a second shunt opening release MX2
- undervoltage release (MN)
- time delayed undervoltage release (MNR: MN + time delay).

The time delay, placed outside the circuit breaker, can be disabled by an emergency stop button to give instant circuit breaker opening.
- low energy release (Mitop).

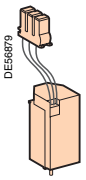
Note: *see the table of the releases' combinations on the following page.*

Shunt opening release (MX1 and MX2)

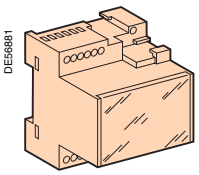
Energizing this release causes instant opening of the circuit breaker.
Permanent power supply to the MX unit locks the circuit breaker in the "open" position.

Characteristics		
Power supply	See "Order form" page	
Threshold	0.7 to 1.1 Un	
Consumption (VA or W)	Triggering	200 (for 200 ms)
	Latched	4.5

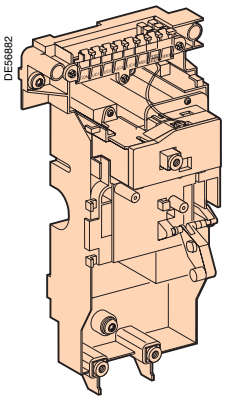
Description of functions
Opening circuit (cont.)



Undervoltage release (MN)



Time delay for undervoltage release (MN)



Low energy release (Mitop)

Undervoltage release (MN)

This release unit causes the systematic opening of the circuit breaker when its supply voltage drops below a value less than 35% of the rated voltage, even if this drop is slow and gradual. It can open the circuit breaker between 35% and 70% of its rated voltage. If the release unit is not supplied power, manual or electrical closing of the circuit breaker is impossible. Closing of the circuit breaker is possible when the supply voltage of the release unit reaches 85% of its rated voltage.

Characteristics		
Power supply	See “Order form” page	
Threshold	Opening	0.35 to 0.7 Un
	Closing	0.85 Un
Consumption (VA or W)	Triggering	200 (for 200 ms)
	Latched	4.5

Time delay for MN

To eliminate spurious tripping of the circuit breaker when there are brief voltage drops, the MN action is controlled with a time delay.
This function is achieved by adding a time delay unit outside of the undervoltage release (MN) circuit (adjustable time delay).
This unit is placed outside the circuit breaker and can be inhibited by an emergency stop button to obtain instant circuit breaker opening.

Characteristics		
Power supply	See “Order form” page	
Threshold	Opening	0.35 to 0.7 Un
	Closing	0.85 Un
Consumption (VA or W)	Triggering	200 (for 200 ms)
	Latched	4.5
Time delay	0.5 s - 0.9 s - 1.5 s - 3 s	

Low energy release (Mitop)

This release includes a low consumption unit and is specifically used with the Sepam 100LA self-powered unit (“REFLEX MODULE”), or the VIP relay.

Characteristics	
Power supply	Direct current
Threshold	0.6 A < I < 3 A

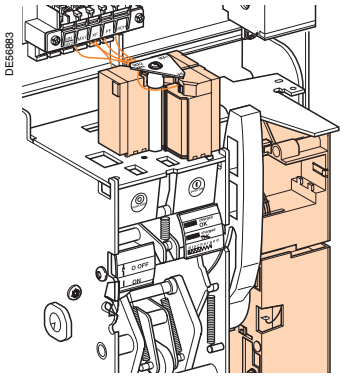
Any tripping due to the Mitop release unit is momentarily indicated by an SDE type changeover contact.
This release also includes a coil (reset) enabling remote SDE contact reset.

Comment:
Use of the Mitop low energy release requires adjustment of the protection relay time delay in order to ensure that the circuit breaker trips between 45-50 ms.

Releases combinations table

Shunt opening MX1	1	1	1	1	1	1
Shunt opening MX2		1			1	
Undervoltage MN			1			1
Mitop				1	1	1

Description of functions
Remote control



Circuit breaker equipped with remote control

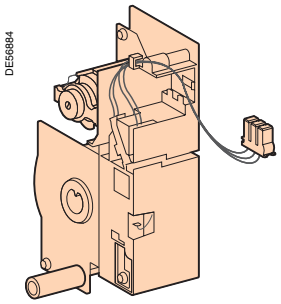
Function

Remote control enables the remote opening and closing of the circuit breaker.

The opening order always takes priority over the closing order.
In the event of simultaneous opening and closing orders, the mechanism discharges under no load, without moving the main contacts. The circuit breaker remains in the “open” position.
In the event of latched opening and closing orders, the mechanism carries out anti-pumping function as standard, by blocking the circuit breaker in the “open” position.
Anti-pumping function: after opening on a fault or deliberate opening via the manual or electrical mechanism, the closing order must be interrupted then reactivated to enable reclosing of the circuit breaker.

Composition

The remote control comprises:
- an electrical motor (MCH) equipped with a “spring armed” CH limit switch
- a shunt closing release (XF).

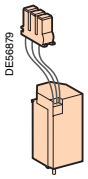


Electrical motor MCH

Electrical motor (MCH)

The electrical motor carries out the automatic rearming of the storage energy springs as soon as the circuit breaker closes. This allows instant reclosing of the device after opening. The arming lever is only used as a backup control in the case of the absence of the auxiliary power supply.
An electrical motor (MCH) equipped with a “spring armed” CH limit switch.
This contact indicates the “armed” position of the mechanism (springs armed).

Characteristics	
Power supply	See “Order form” page
Threshold	0.85 to 1.1 Un
Consumption (VA or W)	180
Motor overcurrent	2 to 3 In for 0.1 s
Arming time	6 s maximum
Operating rate	3 cycles maximum per minute
CH contact	10 A/240 V



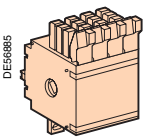
Shunt closing release XF

Shunt closing release (XF)

This release allows remote closing of the circuit breaker when the control mechanism is armed. It can be permanently or briefly supplied power.

XF characteristics		
Power supply	See “Order form” page	
Threshold	XF	0.85 to 1.1 Un
Consumption (VA or W)	Triggering	200 (for 200 ms)
	Latched	4.5

Description of functions
Indication



Rotary type contacts (OC)

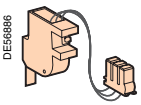
"Open/closed" auxiliary position contacts (OC)

These auxiliary contacts indicate the "open" or "closed" position of the circuit breaker.
- Rotary type changeover contacts directly controlled by the circuit breaker mechanism.
- Indicator contacts are proposed:
  - for standard relaying applications
  - for low level control applications with plc's or electronic circuits.

This version is compatible with Sepam series 20-40-80 units.

Characteristics			
Standard delivery			4
Maximum quantity			11
Breaking capacity (A)	Standard		Min. load: 100 mA/24 V
Cos φ: 0.3	V AC	240/380	10/6*
AC12/DC12		480	10/6*
		690	6
	V DC	24/48	10/6*
		125	10/6*
		250	3
	Low level		Min. load: 2 mA/15 V DC
	V AC	24/48	6
		240	6
		380	3
	V DC	24/48	6
		125	6
		250	3

* Standard contacts: 10 A; optional contacts: 6 A (temperature derating)

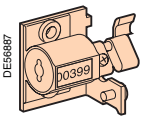


"Ready to close" PF contact

"Ready to close" PF contact

The circuit breaker is "ready to close" when shown by a mechanical indicator and a PF contact.
This information simultaneously indicates that:
- the circuit breaker is open
- the storage energy springs are armed
- there is no permanent closing order
- there is no permanent opening order caused by:
  - a safety opening order (2nd MX or MN)
  - keylocking of the device in the open position.

Characteristics			
Standard delivery			0
Maximum quantity			1
Breaking capacity (A)	Standard		Min. load: 100 mA/24 V
Cos φ: 0.3	V AC	240/380	5
AC12/DC12		480	5
		690	3
	V DC	24/48	3
		125	0.3
		250	0.15
	Low level		Min. load: 2 mA/15 V DC
	V AC	24/48	3
		240	3
		380	3
	V DC	24/48	3
		125	0,3
		250	0,15

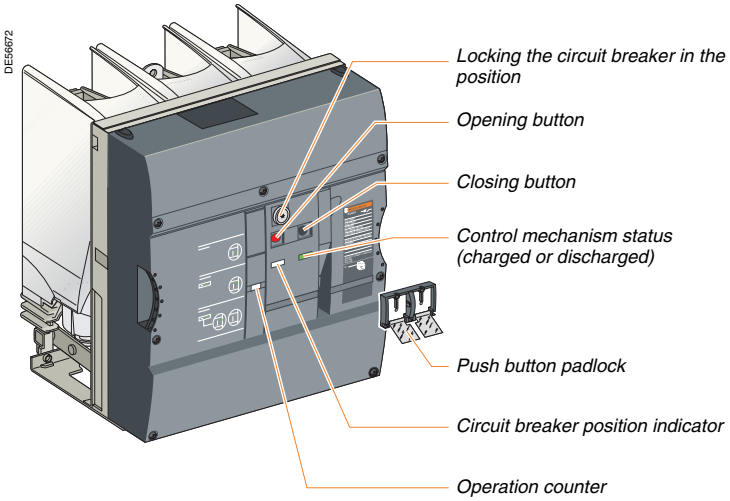


Operation counter (CDM)

Operation counter (CDM)

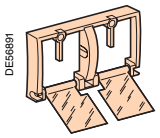
The operation counter is visible on the front panel.
It totalizes the number of switching cycles (CO) that the device has carried out.

Description of functions
Locking/interlocking

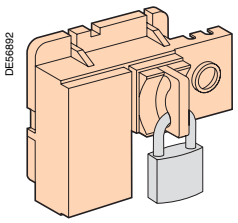


Push button padlock

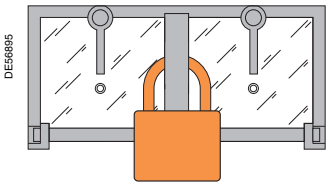
This transparent screen blocks access to the opening and closing push-buttons on the circuit breaker.
The device enables the opening or closing push button to be locked independently. It is often associated with an electrical motor (MCH).
Locking is achieved either:
- by 2 screws
- by 3 padlocks, not supplied
- by a lead seal.



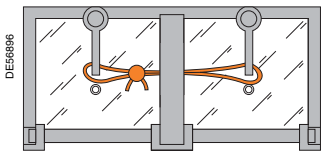
Push button padlock



Padlocking of the circuit breaker in the “open” position



Padlocking



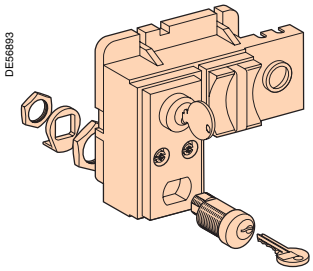
Lead sealing

Locking of the circuit breaker in the “open” position

The circuit breaker is locked in the “open” position by blocking the opening push button in the engaged position:
- by a padlock 1 to 3 padlocks, not supplied
- by a keylocks 1 or 2 different keylocks, not supplied

The keylocks are of captive key type, with the key free after locking, either Profalux or Ronis (right turn), and are proposed according to the options either with:
- 1 single keylock
- 1 single keylock mounted on the circuit breaker + 1 identical delivered separately for interlocking with another device
- 2 different keylocks for double locking.

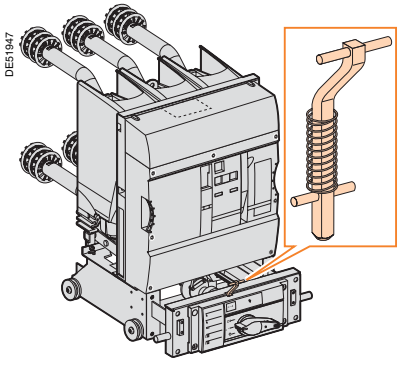
Profalux and Ronis keylocks are inter-compatible.



Keylocking of the circuit breaker in the “open” position

Cubicle door interlocking mechanism

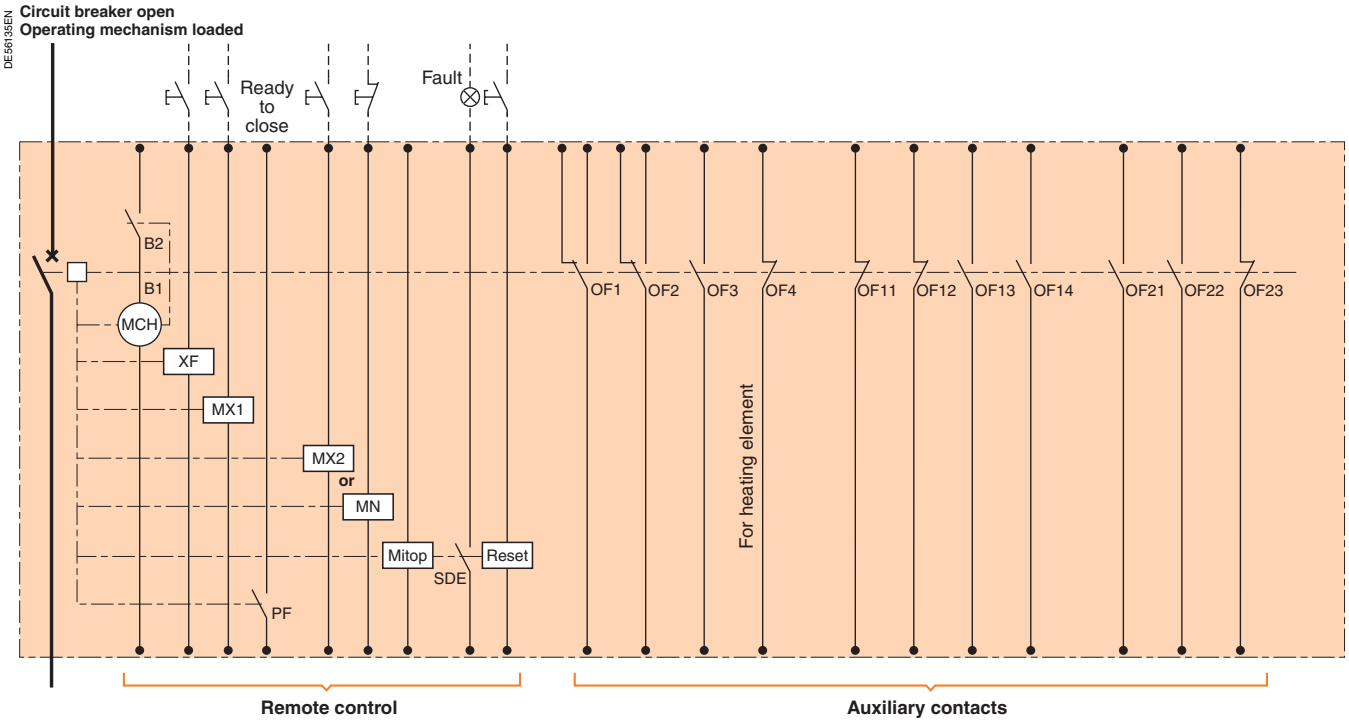
This device enables the circuit breaker to only be operated when the door is closed, for the withdrawable version with a cradle.



Cubicle door interlocking mechanism

Description of functions
Wiring diagram

Wiring diagram (principle)



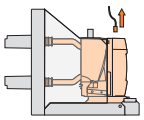
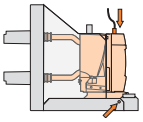
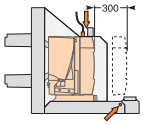
MCH: electrical motor
XF: shunt closing release
MX1: shunt opening release
MX2: shunt opening release
***or** MN: undervoltage release*
Mitop: low energy release
SDE: electrical fault signal contact
Reset: remote SDE contact reset
PF: "ready to close" contact

Description of functions
Safety functions

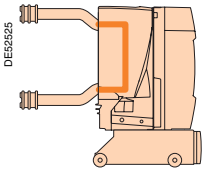
This table describes the safety functions available on the withdrawable version of the Evolis 17.5 kV circuit breaker.

How to use the table
Each of the boxes describes the functional status of each circuit breaker position and the associated parts:

- Possible status
- Possible status, operation impossible
- Impossible status

Parts		Circuit breaker positions					
			Insertion ⇢ / ⇠ Extraction			Racking-in ⇢ / ⇠ Racking-out	
		Removed		**Disconnected**	**Test position**		**Service**
1 - Cradle			Fool-proof protection (1)				
			Anti-drop (2)				
		No opening shutters					
		Shutters padlocking possible					
2 - LV plug	Disconnected			No racking-in			
	Connected				No unplugging		
3 - Circuit breaker	Closed				No racking-in		No racking-out
	Open					No closing	
		Open position circuit breaker locking available					
4 - Switchboard door	Open				No racking-in		
	Closed				No door opening (3)		
5 - Earthing switch	Open					No earthing switch closing	
	Closed				No racking-in		

***(1)** This protection mechanism ensures that the performance levels of the circuit breaker correspond with those of the cradle.*
***(2)** Device that prevents the circuit breaker from dropping when extracted from the cradle.*
The device can be either unlocked manually or when the extraction rig is put in position.
***(3)** Interlocking device to be fitted to the cubicle door. If there is no interlocking, the circuit breaker device should be inhibited.*

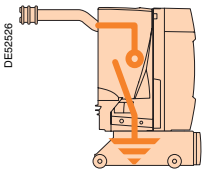


Disconnecting truck

Disconnecting truck

This device allows disconnection of the upstream and downstream circuits in the cubicle. It is installed in the same location as the withdrawable circuit breaker in the cradle.
It includes a device to lock it in the in-service position.

Electrical characteristics					
Rated voltage	**Ur**	kV	7.2 to 17.5V		
Phase distance		mm	145	185	240
Rated normal current	**Ir**	A	1250	1250	2500
Short-time withstand current (3 s)	**Ik**	kA	25	31.5	40
Making capacity		kA peak	2.5 Ik (50 Hz) & 2.6 Ik (60 Hz)		



Earthing truck

Earthing truck

This device is a safety accessory used in place of the withdrawable circuit-breaker in order to earth the busbars.
Possibility of locking by padlocks in the service position.

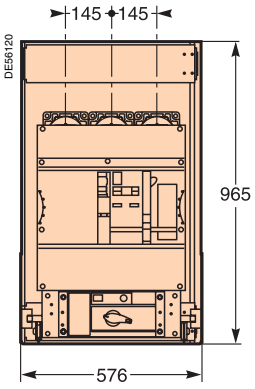
Electrical characteristics					
Rated voltage	**Ur**	kV rms	12	17.5	17.5
Phase distance		mm	145	185	240
Short-time withstand current (3 s)	**Ik**	kA	25	31.5	40
Making capacity		kA peak	2.5 Ik (50 Hz) & 2.6 Ik (60 Hz)		

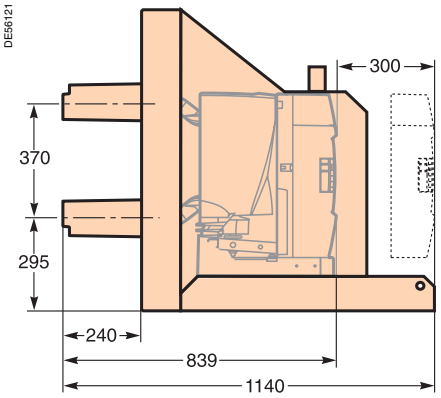
Dimensions

Device

Phase to phase distance 145 mm

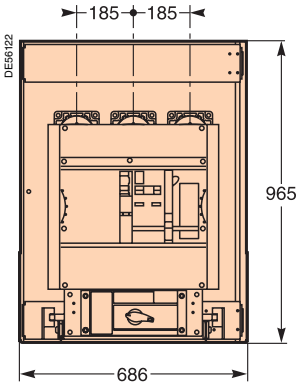
Ur	Isc	Ir	Weight
7.2 kV	25 kA	630 A	165 kg
		1250 A	
12 kV	25 kA	630 A	
		1250 A	

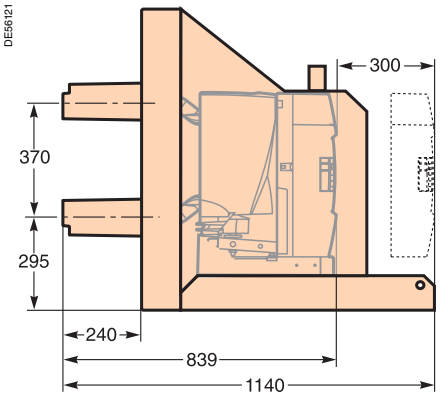




Phase to phase distance 185 mm

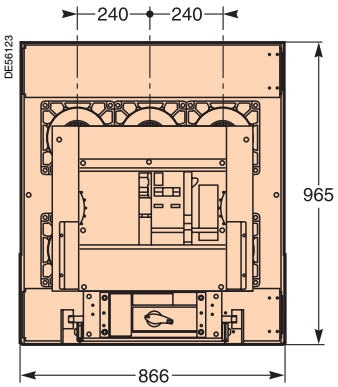
Ur	Isc	Ir	Weight
7.2 kV	25 kA	630 A	174 kg
		1250 A	
	31.5 kA	630 A	
		1250 A	
12 kV	25 kA	630 A	
		1250 A	
	31.5 kA	630 A	
		1250 A	
17.5 kV	25 kA	630 A	
		1250 A	
	31.5 kA	630 A	
		1250 A	

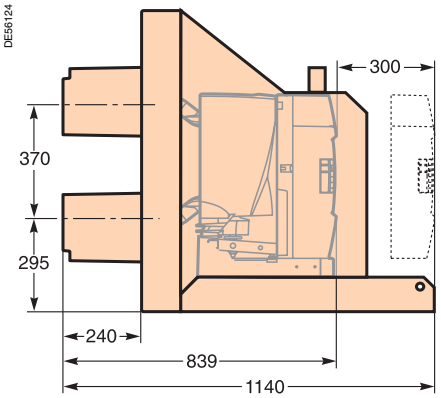




Phase to phase distance 240 mm

Ur	Isc	Ir	Weight
7.2 kV	25 kA	2500 A	272 kg
	31.5 kA	2500 A	
	40 kA	630 A	
		1250 A	
		2500 A	
12 kV	25 kA	2500 A	
	31.5 kA	2500 A	
	40 kA	630 A	
		1250 A	
		2500 A	
17.5 kV	25 kA	2500 A	
	31.5 kA	2500 A	
	40 kA	630 A	
		1250 A	
		2500 A	





Important
Detailed installation instructions are given in the “Evolis Installation Guide”. Please consult us.

Order form

Only one of the boxes (ticked [X] or filled [ ] by the needed value) have to be considered between each horizontal line.
Orange box [X] corresponds to none priced functions.

Basic withdrawable, frontal circuit breaker

Quantity [ ]

Rated voltage Ur **(kV)** [ ]

Rated short-circuit breaking current Isc **(kA)** [ ]

Rated normal current Ir **(A)** [ ]

Phase distance (mm) **145** [ ] **185** [ ] **240** [ ]

Colour for push buttons and indicators IEC standard [ ] ANSI standard [ ]

Circuit breaker options

1st opening release (see possible choices in combination table below)

Shunt opening release - **MX1**

24 Vac [ ] 24…30 Vdc [ ] 100…130 Vdc/ac [ ]
48 Vac [ ] 48…60 Vdc [ ] 200…250 Vdc/ac [ ]

2nd opening release (a 42-pin LV plug is mandatory)

Shunt opening release - **MX2**

24 Vac [ ] 24…30 Vdc [ ] 100…130 Vdc/ac [ ]
48 Vac [ ] 48…60 Vdc [ ] 200…250 Vdc/ac [ ]

Undervoltage release - **MN**

24 Vac [ ] 24…30 Vdc [ ] 100…130 Vdc/ac [ ]
48 Vac [ ] 48…60 Vdc [ ] 200…250 Vdc/ac [ ]

Time delay unit for **MN**

48…60 Vdc/ac [ ] 100…130 Vdc/ac [ ] 200…250 Vdc/ca [ ]

Low energy release **Mitop**
1 AC fault signalling SDE and reset 200...250 Vac are included [ ]

Remote control

Electrical motor - **MCH**

24…30 Vdc [ ] 100…125 Vdc [ ] 200…250 Vdc [ ]
48…60 Vdc/ac [ ] 100…130 Vac [ ] 200…240 Vac [ ]

Shunt closing release - **XF**

24 Vdc [ ] 24…30 Vdc [ ] 100…130 Vdc/ac [ ]
48 Vdc [ ] 48…60 Vdc [ ] 200…250 Vdc/ac [ ]

Operation counter CDM [ ]

Additional auxiliary contacts OF (4 AC) 1 [ ] 2 [ ]

Ready to close contact PF (1 AC) [ ]

LV plug 42-pin LV plug (instead of 18) [ ]

Operating shaft Quantity (one mini per switchboard) [ ]

Locking of the circuit breaker in the open position

By padlock [ ]
or by locks and keys Profalux [ ] Ronis [ ]
If locks 1 lock [ ] 2 identical locks [ ] 2 different locks [ ]

Push buttons padlock of O/C circuit breaker [ ]

Cradle

Quantity [ ]

Phase distance (mm) **145** [ ] **185** [ ] **240** [ ]

Cradle accessories

Racked in/out C.B. position signalling (4 AC) [ ]

C.B. "ready to be operated" PAF (1 AC) [ ]

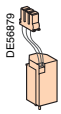
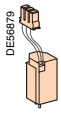
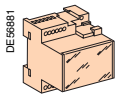
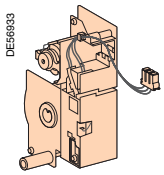
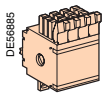
Field deflectors for bushings [ ]

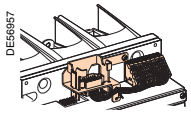
Releases combinations table

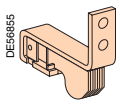
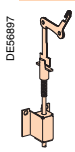
Shunt opening MX1	1	1	1	1	1	1
Shunt opening MX2		1			1	
Undervoltage MN			1			1
Mitop				1	1	1

Offer structure
Separated components

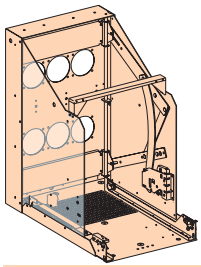
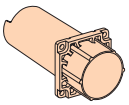
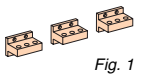
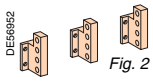
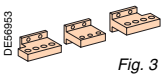
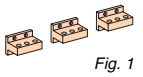
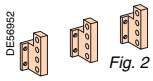
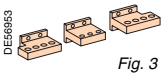
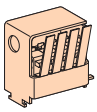
The following components can be ordered separately and can be adapted or replaced by the customer.

Remote control			Ref.
MX1, MX2, XF shunt opening/closing release			
 DE56879	24…30 Vdc	24 V 50/60 Hz	**59284**
	48…60 Vdc	48 V 50/60 Hz	**59285**
	100…130 Vdc - 50/60 Hz		**59286**
	200…250 Vdc - 50/60 Hz		**59287**
MN undervoltage release			
 DE56879	24…30 Vdc	24 V 50/60 Hz	**59288**
	48…60 Vdc	48 V 50/60 Hz	**59289**
	100…130 Vdc - 50/60 Hz		**59290**
	200…250 Vdc - 50/60 Hz		**59291**
Time delay for MN			
 DE56881	48…60 Vdc - 50/60 Hz		**33680**
	100…130 Vdc - 50/60 Hz		**33681**
	200…250 Vdc - 50/60 Hz		**33682**
MCH electrical motor			
 DE56933	24…30 Vdc		**47888**
	48…60 Vdc		**47889**
	100…125 Vdc		**47890**
	200…250 Vdc		**47891**
	48…60 V - 50/60 Hz		**47889**
	100…130 V - 50/60 Hz		**47893**
	200…240 V - 50/60 Hz		**47894**
Additional auxiliary contacts			
 DE56885	4 AC		**47887**
LV terminal blocks			
DE56958	1 terminal block		**47074**

MV and LV connection accessories		Ref.
LV plug		
 DE56957	Standard (18 pins)	**59114**
	All options (42 pins)	**59115**
LV wiring		
	21 marked LV wires fitted in socket type pins	**59117**

Other accessories		Ref.
Earthing device		
 DE56855	Earthing sliding contact on C.B.	**59456**
Labels kit for push button and indicator (O/C)		
DE56898	Circuit breaker specific labels green, red, etc.	**59100**
Circuit breaker opening external device		
 DE56897	Adaptation kit needed for circuit breaker opening (for retrofit)	**59093**

Offer structure
Separated components (cont.)

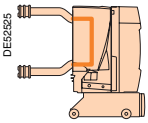
Cradle		Ref.
Cradle without bushings		
 DE56894	Phase distance 145 mm	**59316**
	Phase distance 185 mm	**59317**
	Phase distance 240 mm	**59318**
Bushings		
 DE56895	1 full bushing 630-1250 A	**59382**
	1 full bushing 630-2500 A	**59383**
	(you need at least 6 bushings per cradle)	
Field deflectors for bushings		
DE56939	6 deflectors used to increase dielectric withstand from 75 to 95 kV	**59283**
Upstream and downstream fixed connections, Ir (for bushings)		
 DE56951 *Fig. 1*  DE56952 *Fig. 2*  DE56953 *Fig. 3*	3 fixed distance H or V *(fig. 1)* 630-1250 A	**59400**
	3 variable distance H *(fig. 3)* 630-1250 A	**59401**
	3 variable distance V *(fig. 2)* 630-1250 A	**59402**
Upstream or downstream fixed connections, Ir (for bushings)		
 DE56951 *Fig. 1*  DE56952 *Fig. 2*  DE56953 *Fig. 3*	3 fixed distance H or V *(fig. 1)* 630-2500 A	**59403**
	3 variable distance H *(fig. 3)* 630-2500 A	**59404**
	3 variable distance V *(fig. 2)* 630-2500 A	**59405**
Racked in/out position signalling		
 DE51950	4 AC	**59173**
Ready to be operated signalling		
DE59938	C.B. “ready to be operated” PAF (1 AC) indicates that the C.B. is locked in place in the cradle	**59174**
Racking base		
	2 rails	**59299**

Offer structure
Separated components (cont.)

Various

Disconnecting truck

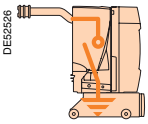
DE52525



Phase distance	Ur	Ir	Ith	Ref.
145 mm	7.2-17.5 kV	1250 A	25 kA	**59476**
185 mm	7.2-17.5 kV	1250 A	31.5 kA	**59477**
240 mm	7.2-17.5 kV	2500 A	40 kA	**59478**

Earthing truck

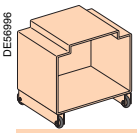
DE52526



Phase distance	Ur	Ir	Ith	Ref.
145 mm	7.2-17.5 kV	1250 A	25 kA	**59473**
185 mm	7.2-17.5 kV	1250 A	31.5 kA	**59474**
240 mm	7.2-17.5 kV	2500 A	40 kA	**59475**

Circuit breaker support frame

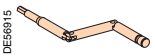
DE56996



	Ref.
Drawings and casters	**59050**

Rack-in/rack-out operation

DE56915



	Ref.
Operating shaft	**59449**

Technical documentation

DE56997

	Ref.
User manual	**59069**

Services

The following components can only be adapted or replaced on site by staff trained by Schneider Electric:

- remote control mechanism (comprising: electrical motor, shunt closing release, operation counter)
- operation counter
- low energy release (Mitop)
- interlocking between the “open” circuit breaker position and the LV plug
- racking truck
- circuit breaker front cover.